ACADEMIA | Letters

Economic Impact of Human Capital Investment in Texas: Does Bachelor's degree matters?

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1. Economic and Education in Texas

The concept of human capital has been used over time in various sciences, such as Human Resources, Psychology, Economics, etc. Each of the sciences attributes a particular meaning to it, in this work we would like us to concentrate on the meaning given by Economics.

In Economics, the concept of Human Capital emerged around the 1950s, authors such as Shultz (1961) and Becker (1965) incorporated this term through education. They found relationships in terms of productivity, that is, someone who has more education is more productive in their work, which will be reflected in their salary. Then, higher salary is reflected in an increase in consumption, and with this the economy is activated and economic growth happen.

The Texas economy is in the top 15 of all U.S. state economies. Recently, U.S. Census Bureu published the rank of Gross Domestic Product (GDP) by county. In Figure 1 shows the East Texas Region, for 2019 Smith and Gregg counties are ranked as top of GDP in Texas.

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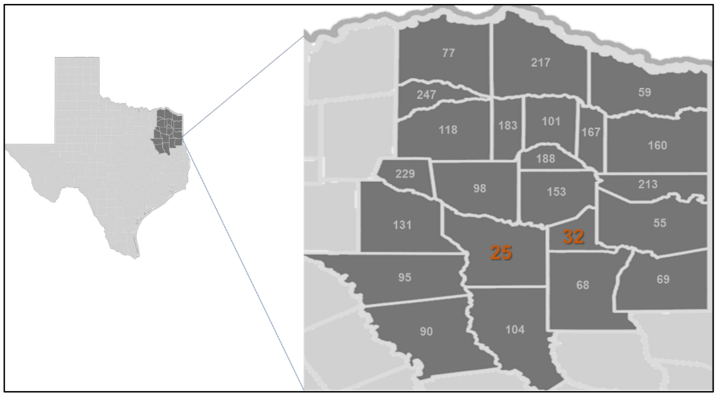
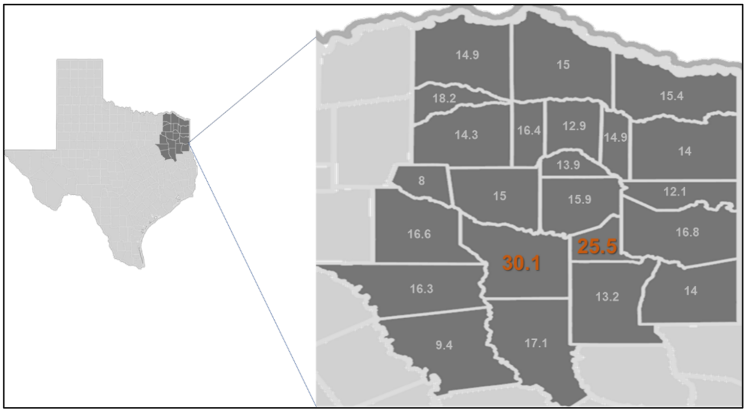
Figure 1. East Texas GDP rank



Source: 2018 Population Estimates; U.S. Census Bureau.

Regarding education is a fundamental piece in all economies, in Figure 2, we calculate the percentage of "Skilled workers" with JobsEq Data. A skilled worker is someone who completes at least Bachelor's degree. The best counties in GDP agree to be the best ones with qualified workers. So, 30.1 percent of jobs in Smith County are filled by qualified employees and in Gregg's case it is 25.5 percent.

Figure 2. Percentage of Skilled workers in East Texas



Source: Own calculation with JobsEq data.

We can observe that could be possible relation between GDP and Education, better o more education reflects improvements in the economy. Another fact about education is a study made by WalletHub in 2019. They create an index that captures the educational attainment of 150 MSAs. Their results shows that Austin MSA is ranked in ninth position of this index, which is one of the most educated MSA in all United States.

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In conclusion, Texas is well positioned in economic and educational terms. This study has two objectives; the first one is estimating the Annual Potential Earnings for Texas. And the second one is measuring the contribution and impact of graduates of the University of Texas at Tyler in 2017 and compare it with other colleges or universities in East Texas.

2. Data and Methodology

For the estimates we use CEPR Uniform Extracts of Current Population Survey (CPS) March, are data published by the Center for Economic and Policy Research. The CPS is the primary source of labor force statistics for population of United States and is sponsored jointly by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics (BLS).We delimit the sample in Full-Time Full-Year workers at age of 16-65 years old in 2017.

The methodology is divided in two stages: Econometric Methodology and Mathematic Methodology. Fist stage, the econometric model used is better known as the "Mincerian model", the equation 1 relates wages to education and potential work experience.[1] Also, the problem of self-selection in the sample must be controlled, for this reason the technique proposed by Heckman (1977) is used to solve it. It is important that the model specification is correct because we estimate the potential earnings form this to use it in the second stage.

3. Results

The results are shown in two sections: Annual Potential Earnings and analysis of the economic impact of UT Tyler graduates. This analysis will compare to East Texas universities offering bachelor's programs.

We used econometric model to estimate the Annual Potential Earnings, it reflects the annual income of any person earned throughout their working life, considering their socio-economic and demographic environment.

Figure 3 shows the Annual Potential Earnings by educational level in Texas. The annual earnings of an individual who get less than high school is equivalent to 26% of someone who get bachelor's degree. And on the other hand, the difference in earnings between bachelor's degree and high school diploma is 33%.

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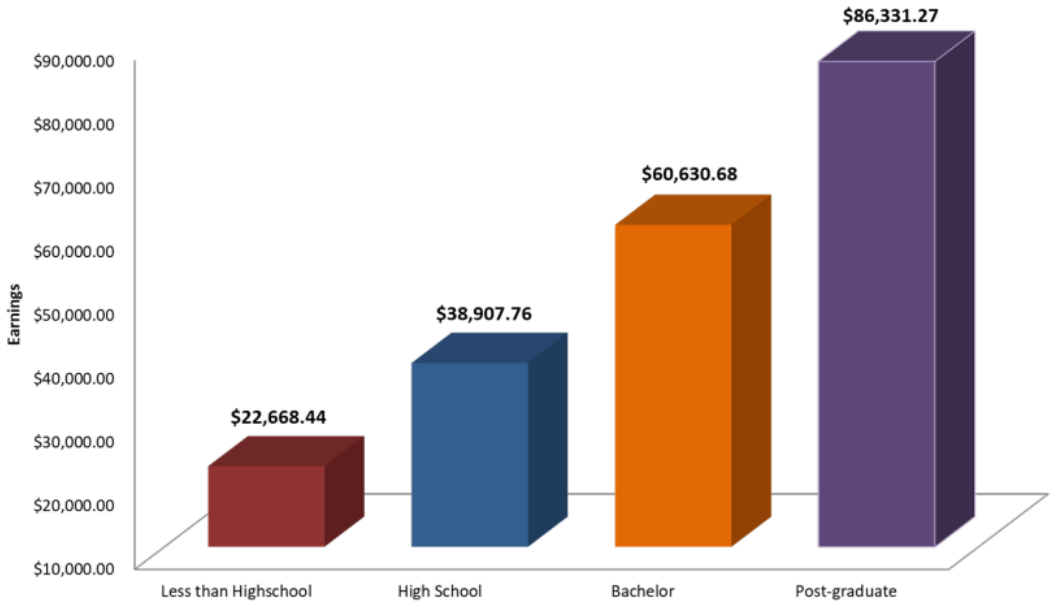

Source: Own calculation with IPUMS-CEPR extract March 2017.

Figure 3. Annual Potential Earnings in Texas, 2016 dollars

Income not only varies by educational level, but also varies by occupation. Figure 4 shows the differences in income between high school diploma and bachelor's degree in the key economic sectors of the state of Texas, i.e. Management, Manufacturing and Healthcare are the key sectors.

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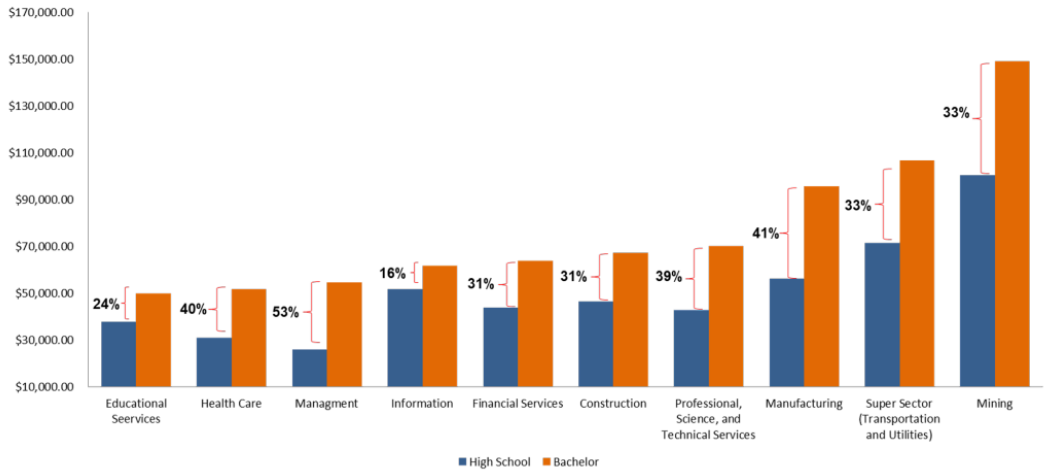

Source: Own calculation with IPUMS-CEPR extract March 2017.

Figure 4. Annual Potential Earnings in Texas by Education and Economic Sectors, 2016 dollars

To measure the economic impact, we collect the number of bachelor graduates of UT Tyler in 2016 and then we built a hypothetical region where the economic impact can be measured. This region is composed by Austin, Dallas, and San Antonio MSA.

First, we simulate the economy of this hypothetical region. In Table 1, we can see the Gross Domestic Product (GDP) and the employment level for the hypothetical region.

Table 1. Hypothetical Region Economy

Gross Hypothetical Product	**$806,482.4 M**
Total Employment	**7.7 M**

Source: Own calculation with IMPLAN software.

Total employment represents 46% of all the total employment of Texas. The analysis has two scenarios. The first one estimates the impact of UT Tyler's graduates. And the second, it analyzes the impact of East Texas' graduates. For the year 2016 the graduates of UT Tyler were 1485, which is equivalent in employee compensation of $70.4 million dollars. East Texas graduates totaled 2889, which is equivalent to $143.2 million in employment compensation.

To build the employment compensation the first stage is the estimation of the annual income per occupation. Then a match was made between the annual income and the careers from which the students graduated. If a career cannot be matched (e.g., administration), the

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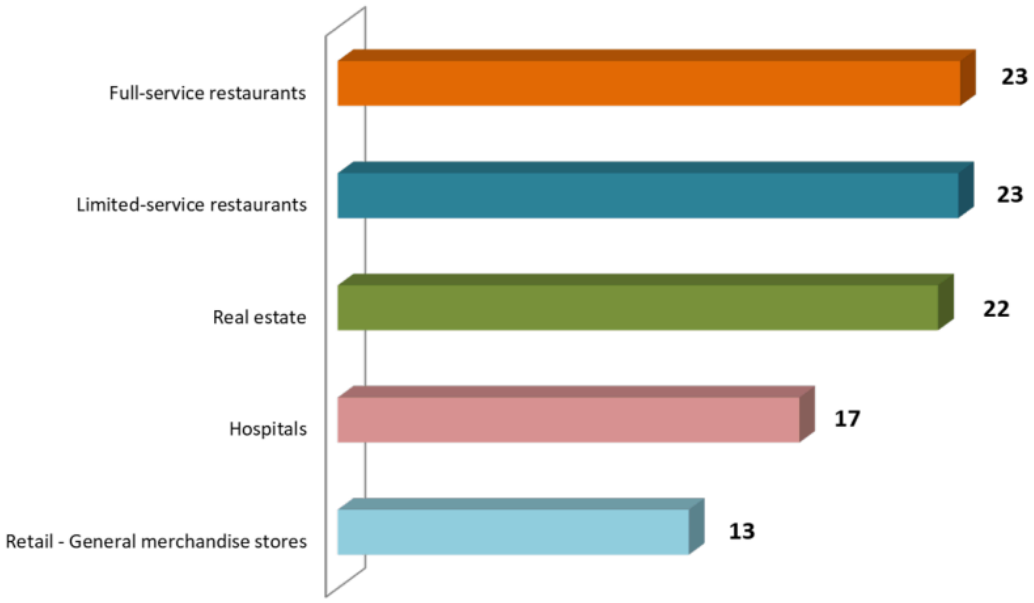
average annual income is charged.

For the study of the economic impact, it is necessary to establish certain assumptions, so that the analysis is accurate. These assumptions are as follows: bachelor's graduates enter the labor market as soon as they finish their carrier. Then, they move to Austin, Dallas, or San Antonio MSAs to work. Finally, the impacts are estimated in the Hypothetical Region that we create (Austin, Dallas, and San Antonio MSAs).

The first result of the economic impact analysis is the employment ripple. According to the assumptions mentioned in the previous section, UT Tyler graduates generate **432 jobs** in the hypothetical region, these jobs are distributed throughout all the economic sectors. The sector that benefits most from employment is full-service restaurants and this makes sense since it is the sector where people usually spend their money (Figure 5).



Source: Own calculation with IMPLAN software.

Figure 5. Employment ripple of UT Tyler Bachelor graduates

The second result of the economic impact analysis is the output ripple. UT Tyler graduates generate a total effect of $66.8 million of dollars in the hypothetical region when they enter the labor market. And contrary to the effect on employment, the economic sectors that benefit most from the output effect are owner-occupied dwellings, real state, wholesale trade, hospitals, and insurance carriers. The total output effect ($66.8 M) is equivalent to .65% of the GDP of Smith County (Figure 6).

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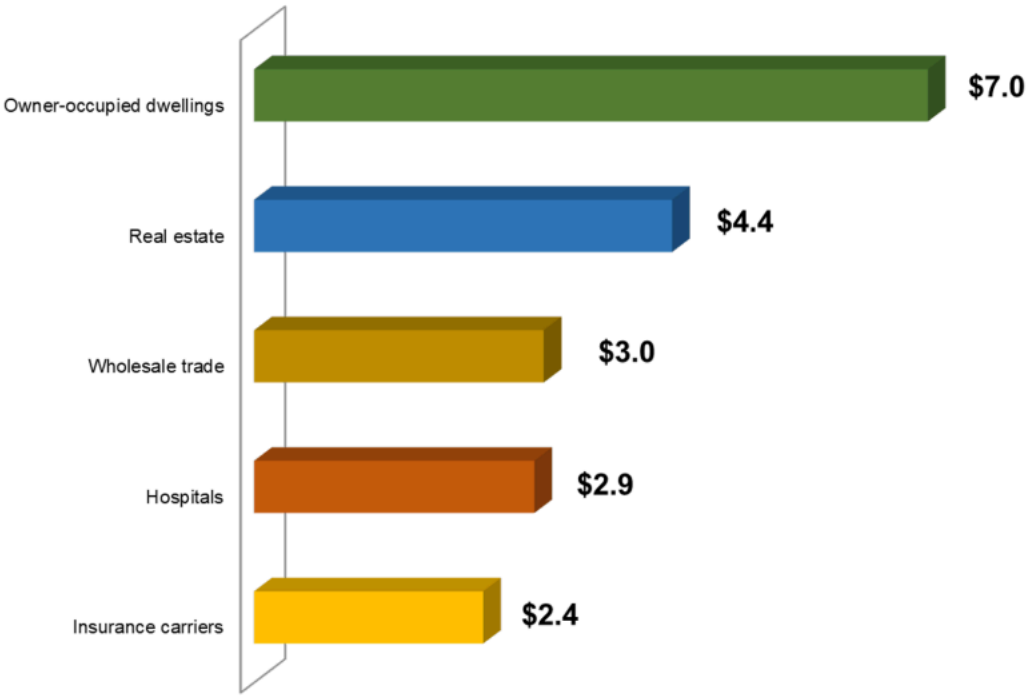

Source: Own calculation with IMPLAN software.

Figure 6. Output ripple of UT Tyler Bachelor graduates, in millions of dollars

Finally, an economic impact analysis was conducted for the total number of graduates in East Texas for the year 2016.[2]. The number of graduates in that year was 2889; in the simulation this yielded an economic impact of about .02% of the GDP of the hypothetical region ($806,482 M). In context, the output ripple of the East Texas graduates is equivalent to 2% of Tyler MSA Economy.

The top three Universities or Collage that contribute more to the output ripple are: University of Texas at Tyler with 49%, LeTorneu University with 15% and A&M Commerce University only with .2%. These percentages over the total output effect. This confirms to us that promote education will always be the key to Economy's growth.

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4. Conclusions

This study was divided into two parts. The first part estimated the potential annual earnings of the individuals for Texas and thus matched the earnings of UT Tyler graduates and for the East Texas graduates. The second part, using these estimated earnings, constructed an employment compensation with which to measure the economic impact on a hypothetical region created. For UT Tyler graduates the ripple was shown in two effects: Employment and Output. The Employment effect was 432 employees generated and the Output affect $66.8 million of dollars. UT Tyler generates the largest number of Human Capital in East Texas, so the education in this University is the engine of growth not only in East Texas but in major cities of Texas. For East Texas graduates only showed the Output effect that was equivalent to 2% of the Tyler MSA Economy.

Finally, this analysis may be helpful to stakeholders, policy makers, and decision makers to identify strengths and weaknesses at their own localities and take actions to improve human capital conditions and education status of their communities.

References

[1] $$wage_i = \alpha + \beta_n educational_{level_i} + \gamma_1 edad_i + \gamma_2 edad_i^2 + \gamma_3 edad_i^3 + \gamma_4 edad_i^4 + \gamma_4 WorkEconomic_{Sector_i} + \lambda_1 MR_i + \varepsilon_i \quad \forall\, n = 1,2,3,4,5$$

[2] Only graduates of Universities or College that offer bachelor's programs.

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